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THE CIVIL DEFENSE COUNTERPART TO A
1973 NUCLEAR WAR SCENARIO

By

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HI-391-RR

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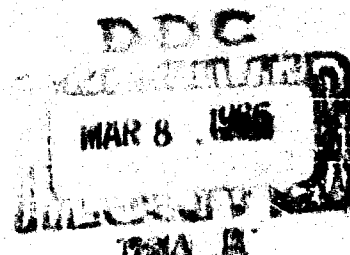
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PREFACE

This scenario was built on material drawn from many sources. The political-military context of the evacuation and the flow of international events was taken from a war game played at the Hudson Institute by Frank Armbruster, William Pfaff and Edmund Stillman.* The scenario activity itself was modeled in many respects after the study of Hurricane Carla put together by the regional Civil Defense Office at Denton, Texas, under Mattie C. Treadwell. The section of the scenario dealing with preparations for evacuation and the handling of intergovernmental relations and public reactions follow this report closely. For technical information I relied heavily on the Hudson Institute's 1963 report for OCD, Strategic and Tactical Aspects of Civil Defense with Special Emphasis on Crisis Situations (HI-160-RR), drawing in particular on the section dealing with methods of improvising shelter and the section treating the feasibility of evacuating New York City residents by rail. A draft report, Phasing of Crisis Civil Defense Programs,** by Max Singer, and an unpublished paper of my own, The Evacuation of 112 Urbanized Areas, written in connection with this study, supplied data on how quickly different cities could be expected to evacuate, and on the suitability of adjacent areas for reception. Calculations of fallout patterns and fallout deaths were made on the basis of data in The Effects of Nuclear Weapons. Data on summer wind speeds and directions were taken from a Technical Operations, Incorporated, study, The Probable Fallout Threat over the Continental United States. The same organization's Shelter from Fallout provided figures on the availability of basements in various sections of the country.

In addition to these printed sources, I drew heavily on the expert knowledge of particular Institute staff members; I am indebted to Robert A. Krupka for technical material on shelter overcrowding*** and to Dr. William M. Brown, Director of Civil Defense Research at Hudson Institute, for information touching almost every aspect of this scenario.

*Study of the Political and Strategic Implications of an ABM, HI-335-RR/3, Volume III, Annex I, "Political-Military Context or Prototype Game," by Frank Armbruster, William Pfaff and Edmund Stillman, Harmon-on-Hudson, New York, Hudson Institute, September 30, 1964 (TOP SECRET, Separately Bound), prepared for the Nike-X Project Office, Army Materiel Command, Huntsville, Alabama. For an unclassified version see Annex II of HI-335-PR, the progress report for this study.

**HI-330-D. Prepared for the Institute of Defense Analyses and submitted February 14, 1964.

***Much of this information can be found in HI-361-RR/4, Overcrowding Potential, by Robert A. Krupka, prepared under Contract No. OCD-05-63-122, Task No. 4113D, Office of Civil Defense, Department of the Army, and submitted June 11, 1964.

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SUMMARY

The subject of this paper was to study the implementation of a particular civil defense program in an escalating crisis situation. The date selected for the test situation was mid-summer of 1973. We postulated that a full fallout shelter program had been initiated seven years earlier, in '66. This program was to provide a space for every citizen in his neighborhood and was to be completed in eight years. Simultaneously, planning was undertaken for additional measures which could be implemented quickly in an emergency -- evacuation, the transport of food and other supplies into projected reception areas, the construction of expedient and improvised shelter. Approximately a billion dollars was expended on the total CD program each year after fiscal '66.

The political-military events against which these preparations were tested were adopted from an existing escalation and attack scenario written in connection with a study of ABM. In this scenario, demands for new civil defense actions arose in an arbitrary fashion, much as they might during an authentic crisis. The aim of this study was to analyze one civil defense response which might be likely, given the history of the crisis and the resources available, and to trace the consequences of these steps in the scenario environment. We considered both the specific nature of measures which might be taken, and their timing both in relation to each other and to the flow of crisis events. We tried to identify the developments in the crisis which might trigger increased civil defense activity, estimated how far preparations might be completed before the main attack arrived, described hypothetical responses in several parts of the country, and calculated the disposition of people and the number of casualties in the immediate postattack period.

Because of the nature of the crisis and the postulated preparations, the study focuses on urban evacuation and efforts to provide fallout shelter, food, and services in the reception areas. If an attack were delivered on short warning or if the posture included some blast shelters, other problems might have predominated.

The following table presents in condensed form the political-military events of the scenario and the corresponding civil defense response. On the left side the critical points in the crisis are described. The right-hand column shows the CD preparations triggered by these developments. As a rule, any time mentioned in the description of an event is correct for the area in which the event is taking place. The corresponding Washington and Moscow Times have been noted in the left-hand margin. Since the scenario is seen from the American point of view in this paper, events have been assigned their Washington dates.

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TIME LINE - 1973 WAR

Date	WT ²	MT ²	Scenario Event	U.S. Civil Defense Response
March 23, 1973			East Germany calls for a general conference on European security.	
Monday, July 2			Conference opens.	
Tuesday, July 3			East and West Germany issue joint memorandum calling for a confederation of the two countries.	
Wednesday, July 4			Street demonstrations in East Germany suggest possibility of full-scale revolt developing and potential spread to other Soviet satellites. Much sympathy is expressed by the West Germans. General fears of possible escalation felt in NATO and rest of the world.	<u>National CD network alerted for the possibility of trouble:</u> State and local governments, industries with CD responsibilities check out their plans, organization, and preparations and put them into shape where necessary. Instruction of personnel in CD skills is moderately accelerated; distribution of identification and insignia to personnel. Testing of emergency equipment. Distribution of nuclear threat information to public; printing and stocking of specific disaster instruction.
Thursday, July 5			Soviet <u>coup d'état</u> attempted. Members of the East German Government who escape arrest join at an airbase held by loyal troops, establish an independent anti-Soviet government.	
Friday, July 6	1:00 a.m.	7:00 a.m.		
Saturday, July 7				
Sunday, July 8				
Monday, July 9				
Tuesday, July 10				
Wednesday, July 11				
Thursday, July 12				
Friday, July 13				
Saturday, July 14				
Sunday, July 15				
Monday, July 16				
Tuesday, July 17				
Wednesday, July 18				
Thursday, July 19				
Friday, July 20				
Saturday, July 21				
Sunday, July 22				
Monday, July 23	5:00 a.m.	11:00 a.m.	Mid-morning, Independent government broadcasts appeal to troops. Regular East German units begin to go over to the Independent government; fighting between these forces and Soviet-oriented political police forces develops all day.	<u>Low-level official preparations initiated:</u> OCB expenditure of emergency funds authorized. Work on completing full fallout shelter program speeded up through overtime, addition of crews.

²Washington Time.
²Moscow Time.

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TIME LINE - 1973 WAR (Cont'd)

Date	WT	MT	Scenario Event	U.S. Civil Defense Response
Tuesday, 10/23/73 (cont'd)	11:30 a.m.	5:30 p.m.	Late afternoon, West Germany, which had opened communications with the independent government earlier in the day, issues a warning that it will not stand by if foreign troops intervene in the East German civil war.	<p>Movement of federal supplies from reception areas initiated on a small scale.</p> <p>Stepped up production of goods which would be much in demand during an emergency encouraged by OGD.</p> <p>A small fraction--1/10 of 1%--of urban population visits relatives.</p>
	1:30 p.m.	7:30 p.m.	U.S. appeals to Soviet Union to settle with the Independent government, urges West Germany to be calm.	
Tuesday, 10/24/73	10:00 a.m.	4:00 p.m.	Mid-afternoon, first Soviet military units are committed in East German struggle. Simultaneously, Soviet rejection of U.S. appeal is delivered in Washington.	<p><u>Augmentation of official preparations:</u></p> <p>Formal alert of organizations with CD roles on all levels.</p> <p>Nation-wide CD warning and communications net put into full-scale operation.</p> <p>Effort to speed up shelter program and deploy supplies intensified.</p> <p>Local governments increase personnel training, round up emergency equipment; some bureaus prepare to set up field operations.</p> <p>Voluntary exodus reaches .5% of the urban population.</p>
	Wed., 11:00 p.m.	5:00 a.m.	West German troops cross East German border at dawn, accompanied by air strikes against Soviet staging points in East Germany. Soviet troops turn to meet the invading forces, opening the way for a strike by independent forces against airfields still held by the pro-Soviet <u>comp</u> government.	<p><u>First involvement of general public in CD effort:</u></p> <p>Reserves and National Guard called up, many assigned to CD duty.</p> <p>CD emergency headquarters opened up in all important population centers.</p>

TIME LINE - 1973 WAR (Cont'd)

Date	AT	BT	Scenario Event	U.S. Civil Defense Response
Wednesday, July 25	1:30 a.m.	1:30 p.m.	Soviets sound out the Poles on their willingness to allow Soviet troop movements through their territory.	Public information campaign opened; civic organizations, institutions and businesses drawn into the effort; volunteers solicited.
Thursday, July 26	6:00 a.m.	12:00 noon	By mid-morning, troops of the GDR Government have lost control of the airfields to anti-Soviet forces.	Effort to deploy supplies intensifies further--absorbs 15-20% of nation's transportation resources by Friday.
	12:00 noon	6:00 p.m.	Hungarians and Rumanians submit a motion to the U.N. General Assembly, calling for removal of all foreign troops from the European states.	CCD recruits contractors for work in the reception areas.
	7:00 p.m.	1:00 a.m.	By midnight, Thursday night, it is clear that Soviet troops in East Germany are in serious trouble.	Run on stores explodes shelves as individuals and communities begin stockpiling emergency goods. 5% of the urban population evacuates voluntarily by Friday.
Friday, July 27	1:30 a.m.	1:30 a.m.	Poles declare themselves unwilling to allow Soviet troops a corridor.	
	9:00 a.m.	3:00 p.m.	Soviet Central Committee decides to strike West German air bases with nuclear weapons.	
	11:00 a.m.	5:00 p.m.	Around 4:00 p.m., Soviet IAH's hit some West German airfields.	All-out CD mobilization; scattered evacuations:
	7:00 p.m.	1:00 a.m.	West Germany requests Washington for release of NATO warheads to West German air force.	Cities near prime military targets and east southwestern and mountain cities order evacuation. Insurance elsewhere varies according to preparedness and the availability of shelter in the surrounding countryside. The local governments of Philadelphia, Albany and Hartford in the East; St. Louis and Minneapolis-St. Paul in the Midwest; and San Diego and Seattle on the West Coast are ready and under evacuation.
Saturday, July 28	6:00 a.m.	12:00 noon	National Security Council sends message to Bonn refusing warhead release and to Moscow warning that if the Soviet Union does not cease fire and evacuate East Germany, nuclear attacks	

TIME LINE - 1973 WAR (Cont'd)

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VI

Date	LT	MT	Scenario Event	U.S. Civil Defense Response
Saturday, July 28 (Cont'd)	9:30 P.M.		will be combat against Soviet staging bases. (The Soviets continue to fire against West German forces.)	New York City begins official partial evacuation, employing National Guard units to assist the movement. Because of the difficulty of providing refugees with shelter, most southern cities choose to wait for the completion of expedient shelter.
		Sun... 3:30 A.M.	Soviet Central Committee orders destruction of high-altitude detonation over East Coast of U.S.	All-out effort mounted to construct expedient shelter in the reception areas. Transportation networks go into round-the-clock operation to move supplies into reception areas. Federal Government introduces price controls, rationing, and monetary and credit measures, and attempts to censor the news media. CD headquarters and information centers set up everywhere, operate on 24-hour schedules. In cities where evacuation has not yet been ordered officially, individuals, industries, and governmental bureaus pack up to move. Valuable equipment and records are shipped to safer areas. Equipment for postal, bank rescue, firefighting and emergency repairs are stationed in the suburbs. 30% of the non-evacuated urban populations leave on private initiative.

TIME LINE - 1973 WAR (Cont'd)

U.S. Civil Defense Response

Date	WT	MT	Scenario Event	Widespread information on evacuation under local action:
Sunday, July 29	8:30 a.m.	2:30 p.m.	Soviet weapon explodes high over coast of southern New Jersey, simultaneously with the warhead of an ABM missile launched from a Philadelphia battery.	President declares state of emergency, but refrains from ordering the nation-wide evacuation, leaving the decision to local action.
Sunday, July 30	1:00 a.m.	7:00 a.m.	Americans confer the remainder of the day, arriving late that night at the decision to attack 30 non-collared ICBM bases in western Russia.	Most cities on the East and West coasts that have not already initiated evacuation do so. Boston evacuation, interacting with evacuations of smaller N.E. cities, creates huge traffic jams but movement is completed by Monday evening. New York City evacuation starts slowly. Levels off at 130,000 people per hour Monday evening, after interfering movements end in Fairfield County, Westchester, and northern New Jersey. High-altitude shot sets off quickly unofficial evacuation in Washington, D.C., where local government still does not feel adequately prepared to order an official one.
	2:05 a.m.	8:05 a.m.	American salvo reaches its targets in Russia.	Because the limited reception areas around Los Angeles are already packed, the city government concentrates on relocating residents from the center of the city to outer suburbs.
	6:00 p.m.	2:00 a.m.	The Soviets decide to airburst a 10-Mt weapon against Akron in retaliation, and to set off a 100-Mt explosion, aimed at demonstrating their reserve power and their willingness to carry the war to further	West of the Appalachians and in the Midwest, response varies with preparedness. Chicago, Detroit, Cleveland, Pittsburgh, and Buffalo delay official evacuation. Remaining major cities and some minor ones move.

Scenario Event

Date	Time	Scenario Event	U.S. Civil Defense Response
Monday, July 30 (Cont'd)		<p>teaches, if necessary, high over the Mojave desert. In order to create the most spectacular show and ensure the widest possible audience for the high-altitude Mojave shot, the attack is to be timed to coincide with daylight on the West Coast.</p> <p>Aaron is struck.</p>	<p>In the South, some of the largest cities, Charleston, Atlanta, West Palm Beach, Miami, Tampa, St. Petersburg, New Orleans and Houston order evacuation. Less populated cities, and smaller ones which do not consider themselves likely targets, promote shelter improvement.</p>
Tuesday, July 31	<p>12:00 a.m. 6:00 a.m. 12:20 p.m.</p>	<p>U.S. informs the S.S. that it plans to take out Zaporozia in reprisal for Aaron, demands the retreat of Soviet troops from East Germany and a cease-fire.</p> <p>Final warning dispatched to Soviets.</p> <p>Zaporozia is struck.</p>	<p><u>Nation-wide urban evacuation:</u> Civil defense preparations are interrupted by the widespread flight for cover which followed the Aaron attack.</p> <p>At 2:00 a.m. the President orders all remaining cities evacuated (those which had based their plans on blast shelter area citizens).</p> <p>City personnel are sent into the neighborhoods to aid way stragglers. Residents of reception areas pack resources to accommodate refugees.</p> <p>Emergency crews, who will report on tactical warning, remain on hand to protect cities, maintain vital facilities for A-1, who do not evacuate. Spare equipment for communication with city disaster is stationed in the suburbs.</p>
Wednesday, August 1	<p>6:00 p.m. 6:10 p.m. 7:05 a.m.</p>	<p>Central Committee reaches decision to attack New York City, Chicago, and 50 smaller cities. A 20-MT missile, fused to groundburst, is targeted against each of the smaller cities, while New York and Chicago, which are known to have A-1 cover, are assigned ten 10-MT groundbursts each.</p>	

TIME LINE - 1973 WAR (Cont'd)

Date	WT	MT	Summary Event	U.S. Civil Defense Response
Wednesday, August 1 (Cont'd)	2:30 a.m.	8:30 a.m.	New York, Chicago, and 50 smaller cities are attacked. Two 10-MT missiles penetrate the Chicago ABM system, one penetrates near New York. 33 of the smaller cities are successfully attacked; ABM systems pick off the remaining 12 10-MT missiles. Simultaneous Continental government are informed by the Soviet Union that Western Europe will be spared unless the U.S. retaliates.	Status of the evacuation at the time of attack: Evacuations of New York, Chicago, and Detroit are interrupted by the attack. Fatalities are approximately 2 1/2 million. Five large midwestern cities--Milwaukee, Pittsburgh, Detroit, Cleveland and Chicago--and two eastern ones--Washington and New York City--have evacuees in transit. Of these, approximately 250,000 are killed immediately and 550,000 succumb to radiation.
	9:30 a.m.	3:30 p.m.	By early afternoon, West German forces are retreating before a Soviet counter-attack.	Many refugees from Southern cities do not find shelter because conditions did not facilitate improvisation. Over 60,000 are casualties. In a particularly bad situation, approximately 10,000 casualties result among late arriving northern refugees.
	1:00 p.m.	7:00 p.m.	European press: West German retreat appreciated here. De Gaulle statement of firmness arrives.	Some good shelters (PF = 100) prove inadequate, causing about 225,000 fatalities.
Thursday, August 2	3:00 a.m.	9:00 a.m.	U.S. informs Soviet Union that it will take action for defended cities. Needs made re: cease-fire.	
	4:00 a.m.	10:00 a.m.	Leningrad, Kiev, Kharkov, and Moscow destroyed by 4 missile salvo.	
	5:30 p.m.	11:30 p.m.	The Soviet Union requests a cease-fire.	

END

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The attack delivered against U.S. cities totaled 610 megatons, two-thirds of which was assumed to be mission yield. All bombs were produced except the 10-Mt A-bomb shot. Approximately 34 million people succumbed to immediate bomb effects--mainly blast and fire, and about one million in fallout, to produce a combined total of over 4 million fatalities. Chicago and 38 successfully attacked secondary cities were destroyed; the New Jersey sector of the greater New York metropolitan area was devastated.

The evaluation of the postulated civil defense program in the scenario framework suggested several conclusions. First, a surprising degree of mobilization appears to be possible in a relatively short emergency period. Furthermore, it was evident that a program using an effort of this kind could save many lives in scenarios where nuclear strikes are preceded by a day or more of effective warning. A rough estimate indicates that without the emergency action, prompt fatalities in this scenario might have been as high as 26 million rather than 4 million and would have been about 16 million even if one-third of the residents of urbanized areas had left on private initiative. It was equally evident that the crisis mobilization would be quite ineffective in scenarios where out-of-the-blue attacks against cities occur or where the strategic warning is not perceived for whatever reason--although most current analysis seems to conclude that such scenarios are rather unlikely.

The shelter built under the postulated Full-Fallout-Shelter Program proved to be badly distributed for the conditions particular to this scenario. It seemed very likely that under imminent threat of nuclear attack those urban citizens who have adequate time to consider their danger and take protective action would generally be unwilling to use fallout shelters located in the cities, and would attempt to leave the cities instead. Consequently, in the scenario, fallout shelters in the cities were virtually unused, while the number of rural shelters proved insufficient and had to be hurriedly supplemented. This further suggests the advisability of having the capability to handle either spontaneous or planned evacuations. In the event that nuclear war should threaten, substantial movements to rural areas would probably occur whether or not they were part of the official program.

Heavy reliance on a program of emergency measures is open to objections on two counts. First, there is no guarantee that local and national administrations would order the construction of adequate shelter or that urban evacuation would occur only enough in a crisis to be effective. The existence and the disruptive nature of such measures might lead both federal and local administrations into excessive hesitation. While in this scenario almost all components of the emergency program were implemented in time to be useful, the timing in another situation might not be so fortuitous. The possibility that preparations will not be

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initiated during is a weakness of any program which relies primarily on measures to be implemented in an emergency rather than on pre-existing capability. Of course, in absence of the latter, a program of emergency measures does enlarge the range of choices open to the decision-maker at the critical time, and its peacetime cost is much less than a posture of doing nothing.

Secondly, the success of the program depends heavily on the efforts of ordinary citizens during the crisis period. There is a possibility that impending danger of nuclear attack will evoke widespread irrational or uncooperative behavior, rendering the population unable or unwilling to carry out their part. However, we tended to discount this possibility in the scenario on the grounds that both historical studies of cities under wartime attack and studies of human behavior in natural disasters show that people almost always act reasonably and in their own self-interest. In particular, where leadership has been knowledgeable and firm during a crisis the population has generally responded well.

In the process of identifying and piecing together the separate activities which compose an emergency civil defense program for the body of the scenario, a number of questions were raised which might warrant further investigation. Some topics which seemed to need study were:

1. The plans and preparations necessary to ensure that organizations with major emergency responsibilities will be able to switch quickly and smoothly from peacetime activity to their emergency roles if need be. The transportation industry appeared to be a particularly interesting subject for a study because of the diffuse nature of some of its components (particularly trucking) and the heavy requirements placed on it by the program.
2. The feasibility and desirability of developing a re-evacuation capability--the ability to predict heavy fallout areas with sufficient accuracy to allow unsheltered refugees to move from threatened areas to safer ones during the first few hours after an attack.
3. The classes of postwar environment in which evacuation resources remaining after a disaster might have to be employed for the treatment of severe radiation sickness and the development of plans and preparations which will allow us to increase this capacity.

CIVIL DEFENSE COUNTERPART TO A
1973 NUCLEAR WAR SCENARIO

HISTORY OF CIVIL DEFENSE PREPARATIONS: 1964-1973

In the spring of 1973, when Scenario I begins,¹ the United States had a nearly completed fallout shelter posture, up-to-date plans for nuclear emergency, and a small but strategically deployed and skillful cadre of CD professionals able to supervise the implementation of these plans. The responsibility for civil defense had been acquired by the Army in 1964 and was pushed vigorously by this organization in the ensuing years, despite considerable public resistance. In conjunction with progress toward a greater damage-limiting posture which occurred in the mid-1960's, the Army obtained CD budgets in the neighborhood of one billion a year from 1967 on.² The bulk of this (80%) was expended on the construction of additional shelter space in the suburbs, small towns, and rural areas, everywhere that the earlier survey program had not revealed sufficient natural shelter. By 1973, there was at least one shelter space offering a protection factor better than 100 for each citizen within his community;³ the stocking of these shelters with food, water and specialized equipment (dosimeters, medical kits) was two-thirds completed. Some attention had been paid to making public shelters more habitable by providing sanitary facilities, emergency power and light, ventilation, bunks, and communications, but the degree of habitability varied largely with the interest of the local communities, which were partially required to finance and expedite these "extras."

It was widely recognized that while this program would protect the population from the fallout of a counterforce war, it would not defend the population adequately against counterforce attacks. Since a blast shelter program had seemed politically infeasible, efforts to deal with this contingency centered around the concept of civil evacuation. Approximately 55% of OCD research was devoted to planning and organizing for such an emergency effort. In addition, \$100,000,000 a year, 10% of the over-all CD budget, was earmarked for the maintenance of a full-time staff of CD professionals in each urbanized area and field representatives in rural areas, particularly those areas which would serve as reception centers in an urban evacuation. While these men were charged with coordinating the shelter

¹The associated strategic-political scenario (see footnote on page 1) sets the background and should be read first to enhance the understanding of this paper. An outline of its events is available in the Summary (pages iii-ix).

²See chart on page 29 for breakdown of U.S. CD expenditures for 1967-1973.

³So long as the buildings covering the "natural" shelter spaces are not damaged by blast. The extra expense that would be necessary to make natural shelters' "PF's" independent of blast damage to their covering was not incurred.

effort in their area, primary responsibility for the task was shouldered by state and local CO organizations. The main task of the specialists was to study the special problems and resources of their areas for use in a nuclear emergency, and, in cooperation with local officials, to devise appropriate plans and preparations for such a contingency. With this aid, by 1973 almost all cities of 100,000 or more, and some smaller than that, had developed evacuation plans and had made the organizational preparations necessary to carry them out. For example, in most of these cities the police department, the fire department and the department of public works were well acquainted with the city's emergency plans and the roles they would be expected to play, and had briefed and trained their personnel appropriately.

Two major program elements necessary in a full-scale evacuation, the movement of surplus food and other supplies and the construction of reception area fallout shelter for urban refugees, were put off for lack of funds. Part of the emergency planning effort was devoted to devising ways to complete such preparations on short notice. Plans for an all-out effort to move food and supplies were made with the cooperation of the railroad and trucking companies. Other planning centered around the survey of housing resources and soil conditions in the various reception areas of the United States, the development of appropriate shelter improvisation methods to suit these conditions, and the dissemination of this information. In addition, under Army sponsorship, training in evacuation procedures, shelter improvisation, shelter management, CO communications, radiological monitoring, and other emergency civil defense skills was made a standard part of the Army Reserve and National Guard programs. The professional field staff, together with these groups, constituted a trained reserve upon which local groups could draw for guidance and aid during a nuclear emergency.

About 20% of the OCD research was in recuperation and recovery. However, a corresponding effort had barely found its bearings by '73, and had not yet begun to affect CO activities significantly. One early project, a plan for evacuating vital operations of the national government and re-establishing them in reception centers, was put into operation in the 1973 crisis. In some localities, plans for the early movement of portable industrial equipment that would be both hard to duplicate and important for the resumption of production in a postattack environment, were made in consultation with local industry and integrated with the evacuation plan. Almost all of these plans postulated a final evacuation step in which vehicles valuable in the immediate postwar period, such as open trucks, fire engines, bulldozers, cranes, utility repair trucks, and so on, were to be loaded with supplies and moved to a safe place in or beyond the suburbs. Beyond the items above, however, there were no other governmental recuperation and recovery preparations when the crisis developed in 1973.

Since the emergency CO programs involving evacuation and shelter improvisation would be severely reduced in effectiveness if they were not put into operation sufficiently in advance of a nuclear attack, OCD plans focused attention on the phasing of emergency measures in a crisis situation. Although it proved impossible to obtain agreement ahead of time on what crisis

Indicators warranted a particular level of preparatory activity, a plan was produced that described the order of this activity, indicating which measures must be initiated early and which could be safely left to last. Later it proved necessary to modify some particulars of this plan, although its existence made it possible for the OCD to arrive at decisions swiftly during the 1973 crisis and to respond in a manner that reduced bottlenecks, duplication, and floundering.

To a number of cities, options other than evacuation were available. Scattered urban communities (about 5% of the incorporated areas) had on their own initiative built blast shelters. A somewhat larger number (15%) planned to take advantage of adjacent mining works, and had fitted them out as shelters or had emergency plans to do so. Notable among these was Pittsburgh, which, while it had planned on the assumption that mines would be available, had not progressed very far in a program to identify, convert, and assign them at the time of the crisis. Akron, Ohio, a city that is important to the scenario, based its planning on the quick removal of its population to a large limestone mine on the outskirts of town. Consequently, when this city was attacked by surprise late in the scenario, a large percentage of its population was unevacuated. Paradoxically, it was the fact that Akron's plan only required a short warning, that resulted in Akron's being caught unprepared.

Official Positions during the Prewar Crisis: The actual use of the passive defense resources discussed above was much affected by the decisions and policies of the federal government at the time of the crisis. The government's attitude toward the effort of East Germany to establish independence from the Soviet Union was somewhat ambivalent. Soviet loss of control of its satellite would, of course, be welcome in itself. However, this desirable gain would be likely to be accompanied by the loss of West Germany to NATO as a consequence of her neutralization, and by the creation of a united independent Germany unbound by alliance constraints, neither of which were desirable developments. More immediately, there was the danger that the conflict might spread beyond East Germany and might escalate. Both in public and in private, therefore, the United States tried to isolate the conflict in East Germany, and later in the two Germanies, and to discourage escalation. As long as the position could be sustained, the government's public stand was that these events were internal matters of the countries involved, and that American intervention was not contemplated. There was a concurrent effort to keep the press handling of the troubles in East Germany from provoking unnecessary excitement.

One of the important motives behind this restraint was the desire not to create strong fears in the public while the question of which military and CD measures to adopt was still undecided. A basic uncertainty was whether to advise the urban population to stay in the cities, where some had ABM cover and all had fallout shelters, or to order urban evacuation according to the emergency plan. The administration expected that its effort to keep the conflict isolated or at least to avoid escalation to the nuclear level, would succeed. Even if the improbable occurred and general nuclear war should develop, it was believed there was a significant probability that the firing would be concentrated against military

targets rather than cities. If one of the first two possible outcomes--no war, or conventional war only--materialized, evacuation would be unnecessary. In the event of a counterforce war, it could even increase the number of casualties suffered, because some of the population sent into the country might be unable to find shelter there. In addition, it was feared by some that the ordering of a general urban evacuation might be viewed by the Soviets as threatening and might produce just that escalation we were working to avoid.

On July 25th, the third day of the crisis proper, OGD initiated a program to construct expedient shelters in the reception areas which, upon completion, would allow the government to order an evacuation with greater confidence. Construction firms were recruited all over the country and commissioned to construct as many rural shelter spaces as possible by the quickest possible methods--digging large trenches and roofing them, piling earth over corrugated metal arches, and so on. However, OGD estimated that it would be two or three weeks before enough spaces could be provided by this method to shelter everyone. The NSC was advised that in a stark emergency it would be possible to provide shelter for most urban refugees in about two days. However, the process, which would involve measures such as tearing up garages and interior walls for lumber, sawing through floor boards and piling tons of earth on the floors above, would be extremely destructive of property and thus should not be ordered except in a clear emergency. Also, because the program required the labor of the refugees themselves, it could only be initiated after the evacuation was carried out. Thus it involved a two-day period when the urban evacuees would be without adequate protection from fallout. This problem was made more serious by the fact that the hot weather prevailing in most parts of the country at the time reduced the amount of shelter overcrowding which could be tolerated. Refugees who had not been able to complete their preparations could not try to save themselves by packing the pre-existing rural shelter without exposing themselves and the original occupants to the risk that fatal overheating would occur.

Taking into account all these considerations, it was judged best to keep urban residents in the cities unless counterforce attacks were clearly indicated, and, if feasible, until adequate shelter had been created in the reception areas. Up to the time when the Soviets launched their MRBM's against West German airfields, there was no problem in sustaining this decision to put off the evacuation order. Between then and the attack on Akron, the government continued to wait for the completion of reception area shelters, believing that the war would de-escalate or at least could be confined to counterforce strikes or less, for another week. However, the executive was not confident enough in the correctness of this decision to feel justified in opposing local decisions to evacuate during this period. After the attack on Akron, it was clear that the Soviet strategy was quite different from the one we had been postulating, and nation-wide urban evacuation was ordered despite the attendant risks and costs.

In the absence of positive federal direction prior to the Akron attack, the decision whether to evacuate, dig in, or postpone the choice until more information was available was effectively left up to local option. Consequently, the response pattern to various crisis events varied greatly; each

urban locality's decision was a function of its individual resources (e.g., the availability or unavailability of a good reception area, or of alternative resources such as ships, coves, mines or tunnels), whether or not it perceived itself as a likely target, and its level of "civil energy." The presence or absence of an ABM defense was not a crucial factor in determining the degree of evacuation. It was widely believed that while an ABM system could reduce the total damage suffered in an attack, it did not offer a high confidence guarantee of safety. Cities generally were not willing to depend upon ABM systems when a CD option offering more certain protection was believed to exist. In this scenario, the value of ABM was felt where movement out of the target area was difficult or impossible. In Los Angeles, where the evacuation of the population appeared very difficult because of the lack of good reception centers, the presence of an ABM defense coupled with the dispersed character of the city made digging-in appear more attractive. In New York, where evacuation could not be completed before the arrival of the major attack, the ABM cover saved many lives by attriting all but one incoming warhead.

The maps on pages 17 and 18 show the scenario distribution of ABM installations around the country. In the 70's the coverage offered by these systems was being extended to include smaller cities within a 50-mile radius of a major central city. By 1973, San Jose had come under the apron of San Francisco, San Bernardino under the Los Angeles system, and Fort Worth under Dallas. East Coast ABM systems were almost completely linked up from Washington to Boston, with a gap yet to be closed between Boston and New York. Work was in progress to extend the Cleveland system, but at the time of the '73 war, Akron was still unprotected. However, the extended systems successfully protected twelve of the 50 secondary cities that were chosen by the Soviets to be targets of their major attack. These unsuccessfully attacked cities are distinguished on the map (page 17) by a point surrounded by a circle.

CRISIS IMPLEMENTATION OF THE CIVIL DEFENSE PROGRAM: JULY 15 TO AUGUST 2, 1973

July 15-21 National Civil Defense Network Alerted for Trouble: For 16 days to a number of reasons the snowballing of street demonstrations in East Germany aroused more official concern here than incl- general ev- dence of satellite unrest of a similar scale had aroused in evacuation E - 16 the past. First, any disturbance in Germany would attract special attention because of the possibility that Berlin might be involved. Secondly, these demonstrations were clearly being staged with the complicity of the East German government. Thus, the possibility was open that a rebellion on the Hungarian model might develop. To add to this, the West German government was issuing strong statements backing the East German demands and warning privately that it would not find it easy to sit back in the event of "outside interference." Thus, if the East German movement reached a pitch which compelled the Soviets to move in, there was a serious possibility that NATO might be dragged in by West German action. Therefore, although the situation was not yet perceived publicly or officially as an international crisis, in the light of these potentialities

OCD felt it proper to alert the national CD network. However, in line with the government's decision to minimize U.S. involvement in the events in East Germany, OCD held itself as much as possible to initiating processes that would not attract much publicity.

CD units on the state and local levels, and certain wide-scale industries that would be heavily involved in an emergency CD effort (transportation, communications, utilities, construction), were requested to check their plans and preparations and bring them up to date if necessary. Local CD organizations were instructed to alert the heads of these local agencies that had been assigned roles in the local emergency plan. Under this impetus, many lagging CD activities, which were thought of as part of the normal program, were revived. City officials re-familiarized themselves with their CD plans, the kinds of federal and state aid which would be available, and the channels to request it. In some city departments and industries the instruction of personnel in disaster skills was initiated. In some localities identification and insignia were distributed to personnel with disaster responsibilities. Equipment earmarked for CD emergency--electric generators, sirens, communications installations--was widely tested.

In giving the public information, the local CD units proceeded with caution. There was an attempt, however, to distribute generalized disaster information (e.g., literature explaining the nature of the fallout threat, lists of useful evacuation supplies to pack, instruction on how to improvise a fallout shelter). Specific evacuation instructions for individual cities and reception areas, maps of evacuation routes, shelter procedure and decontamination instructions were printed up if not already in stock, but held back.

Monday, July 23
 8 - 9 Low-Level Official Preparations Initiated: News that the Soviet coup d'etat had partially failed and that, in consequence, a civil war was developing in East Germany, began to reach the United States early Monday morning. As the news of rebel successes flowed in during the day, increasing the chances of a Soviet intervention and a subsequent widening of the conflict, the situation began to take on crisis proportions in Washington. Public excitement developed later, with the publication of news and analysis in the Monday evening and Tuesday morning papers.

At OCD it was felt that the situation was serious enough to warrant stepping up the preparatory CD program, even at the expense of adding to public apprehension. In addition, the OCD prepared to initiate some projects for which it would be difficult to get support in a normal atmosphere. However, because of the administration's anxiety to give as little encouragement as possible to public crisis excitement, OCD confined its overt activities primarily to accelerating already existing programs.

On the urging of OCD, the Secretary of Defense and the President's office approved an emergency increase in CD expenditures under the "excepted funds" provision of the current congressional CD enabling act.

With these funds, crews already employed in connection with the full fallout shelter program were put on overtime and new crews were added. This program, which was due to be completed the following spring, 1974, was in its last stages; the contractors were engaged for the most part in finishing already constructed shelters, installing ventilating systems, and stocking food and water. In many places the local governments, attempting to find some channel for their anxieties, joined in this effort to get their shelters prepared for occupancy. Others pushed to complete special projects, such as community blast shelters, undertaken at some earlier date outside the federal program.

In addition to speeding up the completion of the shelter program, OGD did move somewhat to step up national preparation for emergency evacuation. With the cooperation of the transportation industry, the movement of food and construction equipment into designated reception areas was initiated. Since it was midsummer, a number of National Guard and Reserve units were in their two-week training camps at the time; these men were assigned by the Army to assist the transportation effort, mainly in unloading and storing where local facilities were not adequate to handle the inflow. However, the over-all level of this program was low; movement was restricted to materials which the OGD had hoped to deploy within the next two or three years under the regular GD budget, and which could be left in the reception areas permanently in presently existing storage facilities, if the crisis subsided. Manufacturers and suppliers of goods that would be in much demand during an emergency--vaccines, plasma, and antibiotics; batteries and battery flashlights, lanterns, and radios; walkie-talkies; water and air filters; radiation-measuring instruments--were warned of a possible rush. (Most of these suppliers had already calculated the implications of the crisis and formulated plans of their own.) In some areas, where preattack public demand could not be counted on to produce a natural rise in production or mobilization of the supply (for example, vaccines, antibiotics and plasma), OGD actually placed orders.¹⁴

A small fraction of the urban population (about one-tenth of one percent) was sufficiently alarmed by the developments to evacuate voluntarily on Monday.

Tuesday
morning,
July 24
8 - 8

Augmentation of Official Preparations: The prompt intervention of Soviet units in the East German civil war not only confirmed for OGD the wisdom of their Monday decision to initiate emergency GD measures, but led them to think that perhaps they had even been too modest in their plans. Consequently, these were augmented in several areas. Lower level GD offices, state and local governments, and industries that had been asked to accept major emergency responsibilities were formally alerted and asked to be ready to go into action on short notice. The nation-wide GD warning and

¹⁴The subsequent development of the crisis was so rapid that none of these orders were fulfilled at the time of the major Soviet attack.

communications network was manned at full strength. The movement of food, supplies, and materials for fallout shelter improvisation was increased about 50% from the level contemplated on Monday. By Wednesday, this activity was noticeably affecting delivery schedules in the private sector.

On the local level, alerted government and civil defense offices checked out their organizations' readiness for action. City bureaus such as welfare and public health prepared to set up field operations. Many more government agencies and industries joined these giving employees disaster-skill training and instructions. Concurrently, there was a great surge of public interest in the regular training courses run for CD volunteers and public officials.

In many localities these measures were supplemented by an effort to round up community equipment--wrecking trucks, field kitchens, mobile communication trucks, generators, emergency pumps, ambulances, road machinery, etc.--that would be valuable during evacuation or in a postattack period. The owners were asked to maintain such equipment in readiness for a possible emergency.

By Tuesday evening, the number of urban citizens who had voluntarily moved to safer places with friends and relatives was about .5% of the urban population.

Tuesday
night,
July 24
8 - 7

First Involvement of General Public: The entrance of West German troops into the East German civil war, which occurred late Tuesday evening Washington time, opened the immediate possibility that the United States would be involved. The response in Washington was two-sided. On the one hand, the government, hoping to encourage caution in West Berlin and prevent the spread of the conflict, continued to take the position that the war was an internal German matter. On the other hand, since its confidence in its ability to remain disassociated from the war was not high, the administration felt compelled to call up the Reserves and the National Guard and to prepare the public, psychologically at least, for the possibility of emergency measures, including evacuation.

With the encouragement of OGD, extra emergency headquarters were opened up in large cities and in central towns of designated reception areas. Radio, TV and newspapers were encouraged to run features on the nature of nuclear disaster and on the defensive measures available to the public. Specific CD options and instructions, tailored to each area, that had been printed earlier but held back, were distributed by the post office. For the first time, the organizational effort reached local businesses, public institutions and civic groups on mass. Those organizations were asked to help channel public interest into effective cooperation with CD effort. Civic groups and local businesses largely handled the heavy recruitment of volunteer personnel for public shelter operations, firefighting, rescue, and decontamination which followed in the next four or five days. Organizations with a role in moving people or providing services and shelter in the reception areas were asked to complete and test their preparations.

Where schools were keeping summer sessions, children were run through drills and sent home with flyers to keep their parents informed of school plans. In businesses and industries personnel were briefed on measures to be taken in response to various alerts or evacuation orders.

On the national level the effort to move supplies into the reception areas was stepped up again to the point where it was absorbing 15-20% of the nation's transportation. OGD continued to accelerate the shelter-building program by adding new crews and contractors wherever they were available. Newly hired bulldozers were assigned to the expedient construction of trench- or mound-style shelter in reception areas. As jobs in the more formal effort were completed, crews were transferred to this new program. A large number of the construction workers transferred to reception areas brought their families with them.

In transportation and construction the efforts of the private sector were supplemented with those of the Army soon after the mobilization of the Reserves and Guard. Approximately 1.5 million men were called up. Of those, the 400,000 National Guardsmen and the 350,000 Payroll Reservists who had received CD training were assigned to CD duty. The remaining 750,000 men were dispatched to staging camps. Concurrently the Army released some equipment such as trucks, trench diggers, bulldozers, and generators to the CD effort. Both Reservists and Regular Army personnel joined in deploying and operating this equipment which usually went to reception areas near the supplying bases. In addition, the Army assisted in the long-distance transport of government surplus food to locations accessible to urban refugees. Since commercial trucks were abundantly available, the Reserves provided drivers to fill in schedules where civilian teamsters were unavailable. Reserve personnel also assisted state and local CD staffs in emergency tasks.

Private preparations were also accelerated Wednesday and Thursday as West German and Soviet troops battled in East Germany. On the advice of OGD, local communities with special problems began storing water. (Bottling companies and tanker fleets had been alerted earlier.) Individual citizens attempting to stockpile a large variety of goods including food, water, drugs, sand bags, transistor radios, flashlights and gasoline usually found retail stores sold out of any items deemed to be of emergency use. Voluntary evacuation rose sharply. By Friday morning approximately 5% of the urban population (about 6 million people) had left the cities.

Friday, July 27
E - 5

All-Out Preparations and Scatterred Evacuations or Partial Evacuations: On Friday afternoon, the Soviet Union attacked the West German airfields with MRDM's. The news, reaching the United States Friday morning (Washington time) set off a flurry of activity. Most cities collocated with strategic targets ordered evacuation immediately. The exceptions were Columbus, Ohio; Orlando, Florida; and Little Rock, Arkansas. In each of those cases, the SAC base was distant enough so that an attack on it would not greatly damage the city. Besides, neither Columbus nor Orlando had adequate evacuation preparations, and in Little Rock, where claims of de facto segregation of

shelter facilities had been made into a lingering civil rights issue, CO planning had been semi-paralyzed for two or three years.★ The larger co-located cities that did evacuate are listed below, with the associated SAC bases and their distance from it.

<u>City</u>	<u>Name of Base</u>	<u>Population</u>	<u>Distance from City Limits to Base (Miles)</u>
Denver, Colo.	Lowry AFB	800,000	1
Fort Worth, Texas	Cornwall AFB	500,000	0
Dayton, Ohio	Wright-Patterson AFB	500,000	2
Sacramento, Calif.	Mather AFB	450,000	6
Springfield-Holyoke-Chicopee	Westover AFB	450,000	3
Omaha, Nebraska	Offutt AFB	390,000	4
San Bernardino-Riverside	March AFB	380,000	5
Wichita, Kansas	McConnell AFB	300,000	1
Tucson, Arizona	Davis Montham AFB	230,000	4
Spokane, Washington	Fairchild AFB	230,000	6
Shreveport, La.	Barksdale AFB	210,000	4
Utica-Rome, N.Y.	Griffiss AFB	190,000	1
Austin, Texas	Bergstrom AFB	190,000	2

Cities not colocated with strategic bases did not feel as threatened. Statements from Washington continued to hold out hope that evacuation would prove unnecessary. Though the government no longer tried to maintain that the conflict was purely an internal German matter, it continued to express confidence that it could be bottled and that active U.S. participation in the war could be avoided. Local CO professionals, somewhat less sanguine, usually suggested to city governments that evacuation might be advisable, especially if the reception areas surrounding the cities were able to provide shelter for the refugees. On the other hand, where conditions outside were not satisfactory, they continued to recommend that the city hold off.

★We suspect that racial friction would dissolve in the face of real danger, and cooperation take its place. Previous disaster experience seems to justify such an assumption.

until the emergency shelter construction effort in their area was completed. Thus, at this time no evacuations were ordered in the South, where the general scarcity of basements in rural areas made the population dependent on special shelter construction. In the Northeast and some sections of the Midwest, where most private houses and public buildings offered basements that could be converted into shelters with comparative ease, a scattering of cities evacuated. Here, the CD preparedness of the individual community was the determining factor. Hartford, Connecticut, and Albany, New York, where the state governments had taken an early and sustained interest in CD, evacuated about 86%. In the Midwest, evacuations were ordered in St. Louis and in Minneapolis and St. Paul for about two-thirds of the population.

The absence of basements in rural construction was also a problem in the Southwest and the Mountain States. However, most cities in these areas had lively CD programs. Furthermore, since their citizens often drove several hundred miles cross-country on a week-end and were more apt to have had backgrounds in camping or hunting, evacuation appeared less formidable than in the East and Midwest. In addition, even small cities (including centers down to 60,000-70,000) in this sparsely populated area of the country felt conspicuous as targets, much more so than eastern and mid-western cities of a comparable size which were dwarfed by larger neighbors. While the citizens of a northeastern city of 200,000 to 300,000 tended to reason that "the Russians won't bother us, they'll go after New York (or Cleveland, or Chicago, as the case might be)," southwestern and mountain cities of this size and smaller chose to evacuate.

The West Coast reacted very much like the northeastern section of the country. Small cities with energetic civil defense programs, and larger ones with especially serious evacuation problems (Seattle and San Diego), decided it would be wise to evacuate. Because of the limited number of highways serving Seattle, the city required more than 24 hours to clear. Furthermore, because the reception areas were mountainous and sparsely populated, many refugees would be required either to drive long distances or to improvise shelter without the aid of basements, a difficult and time-consuming problem. San Diego was faced with a similar highway problem and a worse reception area problem, because it had to compete with Los Angeles for the scarce reception area spaces. In addition, it was not generally feasible to improvise shelter in the surrounding desert during the summer. Many San Diego refugees chose to drive well into Mexico, Arizona, and Nevada to locate shelter (some of it in mines).

Of the eight largest cities--New York, Los Angeles, Chicago, Philadelphia, Detroit, San Francisco, Boston and Washington--only Philadelphia was prepared to order immediate evacuation; the rest were deterred by the magnitude of the problem, but some took partial steps. Both Philadelphia and New York employed local units of the National Guard to assist in evacuating the underprivileged populations. San Francisco and Boston were unprepared, but offered aid to individual efforts, which were approaching 25% of urban population nationally. Los Angeles, surrounded by desert and mountain, was hamstrung by the lack of reception areas offering shelters or resources for improvising them, and decided to dig in at home instead. In Chicago, governmental ineptness plus a paralysis induced by the fact

that nearly 50% of the city population was Negro and believed to be unwelcome outside, prevented any timely official action. Detroit's problems were a less extreme version of Chicago's. Much of official Washington overreacted, following the emergency plans prepared earlier. Civil defense planning for the city as a whole, however, had been bogged down in the conflicts between its ruling congressional committee and the local government. Consequently, the evacuation of the unofficial city was left to individual initiative. There was also some sentiment that Washington should stay in to demonstrate confidence in its ABM defense, and a fear was expressed that the evacuation would "panic" the other cities.

Everywhere, all-out emergency preparations were under way. Many governments of non-evacuating urban communities recommended that all those who had no compelling reason to stay in the city should plan to leave. Officials sent out their families as an example. Individuals who did not leave on this recommendation packed their bags, loaded their cars with emergency supplies and filled their gas tanks. Private industries with lengthy shut-down procedures, such as chemical and steel, began partially closing down where their output was not needed for emergency purposes. Some packed valuable pieces of equipment for transport to safer localities; others improvised hardening. In rural areas, responsive farmers began rounding up their livestock and improving the protection factors of their barns. Some regional governmental bureaus whose functions were not vital in the emergency but who would have heavy recovery and recuperation responsibilities, moved out to the reception areas to re-establish operations. (Included in this movement were some parts of the Post Office, sections of city welfare and public health departments, and urban branches of federal agencies dealing with agricultural and monetary matters.) Many government agencies that did not evacuate began to ship out their vital records. Military contingents within the cities were relocated. Where feasible, city governments dispersed equipment that would be particularly useful after an attack--fire trucks, mobile utility repair units, mobile health stations, bulldozers and other road-building and construction equipment. Private owners of such equipment were encouraged to follow suit.

In order to control this burst of activity, the federal government attempted to establish a series of legal controls--price fixing, rationing and monetary--and set up a media review procedure in an effort to prevent the propagation of rumors and eliminate exaggeration. Since there was no time to implement checking and enforcement procedures, the success of these measures depended on the cooperation of the individuals and institutions involved. The banking and news media regulations, which had been developed earlier in cooperation with those businesses, were widely effective, but it proved impossible to establish and enforce rationing in this short period. Banks and commercial loan agencies were encouraged to extend credit freely by the announcement that the federal government would guarantee all loans advanced for legitimate emergency expenses. Thus it was possible for families that had evacuated on their own and run through their resources to get loans, and for official emergency organizations to raise funds for supplies and equipment. In other efforts to assist or control the situation, CO headquarters and information centers were operating on 24-hour schedules. The efforts of professionals were rapidly supplemented

by those locally recruited for reception and shelter teams, including administrators, food service personnel, nurses, doctors, engineers, and radio operators.

Simultaneously, the programs to construct expedient shelters and bring supplies into the reception areas were put into highest possible gear. Labor drawn from refugee groups and recruited from both city and country joined military units and construction firms in an all-out effort to obtain enough shelter for the expected influx. Individuals were offered detailed instructions for adapting their own basements for shelter. In a supplementary effort, local CD organizations and volunteer civic groups surveyed the capacity of private cellars and shelters, and available useful space was requisitioned for refugees. The transportation industries, abandoning their commercial schedules, went into a round-the-clock operation in an effort to supply the reception areas while maintaining the flow of necessities into unevacuated cities.

Sunday, July 29 Widespread Initiations of Evacuation under Local Option:
8:30 A.M. The explosion of a high-altitude burst over the East Coast at 8:30 Sunday morning evoked a major reaction. Although the President continued to refrain from ordering a nationwide urban evacuation, he took a number of steps which prepared the way for such a move. Departments, agencies, and official persons were notified of the emergency activity expected of them, special authorities were conferred, and federal resources required for the effort were released. Although in practice most of the groups had been active, the authorities exercised, and the resources used for several days, the presidential move eased the flow of many processes. For the first time the nation was completely united behind the CD mobilization.

The urbanized areas reacted to the detonation with great vigor, though the response varied with the resources available to the city and the level of preparation it had attained. Almost all of the remaining cities east of the Appalachians, from Augusta, Maine, to Charlotte, North Carolina, ordered an evacuation within the next two hours. (Some cities near the mining areas of Pennsylvania and Virginia elected to go underground instead.) Further south and along the Gulf, the response was spottier. Only certain of the larger or more prominent cities--Charleston, Atlanta, West Palm Beach and Miami, Tampa and St. Petersburg, New Orleans and Houston--evacuated officially. Less prepared cities, and small cities (which considered themselves less threatened), continued to promote shelter construction and improvement in preference to dispatching their citizens to rural areas that could not promise them good shelter if war came soon. Both New Orleans and Miami evacuated in the face of very serious problems resembling those of Seattle and San Diego. Calculations showed that these cities would be impossible to empty on short notice (eight hours or so) because of the limited number of highway lanes available, and that evacuees would then have to drive long distances to find shelter because of the unrecaptive character of the immediate hinterland. (Both cities are nearly surrounded by extensive swamplands.) Consequently, city officials were unwilling to put off evacuation any longer.

On the West Coast the reaction was almost the same as that on the East Coast where the explosion was experienced. San Francisco, San Jose, Sacramento and smaller cities down to about 100,000, ordered evacuation. All around Los Angeles the highways were clogged with a mix of independently evacuating Angelinos, refugees from San Diego to the south, and those from the small cities of Ontario, Pomona, Riverdale and San Bernardino to the east. Since this movement was, of itself, rapidly filling up all the easily accessible reception areas, the Los Angeles authorities did not attempt to add to it by ordering an official evacuation, but concentrated instead on the construction of extra fallout shelter in the suburban outskirts of the town, and the dispersal of people from the more heavily populated segments of the city to those areas. Even if the city were attacked and the ABM failed, it was expected that fire would be concentrated in a few congested centers of the city. On the margin there might be a light blast followed by a heavy fallout threat, but with shelters, it was reasoned, the population had a reasonable chance to survive.

West of the Appalachians and in the Midwest the response to the high-altitude burst depended upon existing preparations. Of the big cities, only Cincinnati and Kansas City had reached the point of readiness at which they were willing to order evacuation. Chicago continued to stew. There was a large effort to get preparations going but there had been insufficient prior planning and the emergency activity was inefficiently directed. In desperation, the mayor finally recommended a voluntary evacuation. Detroit, Cleveland, Pittsburgh, and Buffalo speeded up their efforts to get ready, but, like Chicago, were still unprepared to handle an immediate official evacuation. Pittsburgh was still counting on being able to use the nearby mines on relatively short notice. In about equal numbers the smaller cities of the Midwest decided to evacuate, dig in, or wait for further information before making a final decision. Akron, with a big mine just outside the city, had decided that full-scale evacuation would be unnecessary. By this time, 30% of its population had entered the mine.

The situation for the three major cities on the East Coast was complicated. The governments of Boston and the surrounding suburbs ordered evacuation immediately after the blast. The initial movement was slow and disorganized, creating huge traffic jams. Fortunately, a fraction of the population--25%--had already evacuated. The movement was completed after 36 hours (Monday evening). Two-thirds of the population was absorbed by southern Maine and New Hampshire, and the rest were dispersed in rural parts of Massachusetts as far west as the Berkshires.

In Washington, although the evacuation of the federal government was accelerated, the city government still did not feel adequately organized to order and administer a full-scale evacuation of the city as a whole. Because of the absence of official direction, reactions of the citizenry following the Sunday morning high-altitude explosion seemed panicky. A large number began evacuating independently, many with no idea of where to go once they got out of the city. There were heavy traffic jams south of the city. In contrast, Philadelphia, which began a well-planned movement Friday noon, was finished by Sunday. The clearing of the evacuation routes around Philadelphia and the failure of Washingtonians to use the

northern highways eased the situation for Baltimore, which shares these lanes. This city evacuated in an orderly fashion and more quickly than it had expected.

Since Friday morning New York City had evacuated .7 million people in its program to move people from the most congested areas. These were taken largely from Manhattan. In addition, about a million and a half people had left voluntarily; more of these were drawn from outlying areas--Westchester, New Jersey, and Long Island--than would be strictly proportional to population distribution. Once the general flight on the East Coast began, residents of New York City and the urbanized areas of Long Island were forced to wait for the evacuations in surrounding areas to diminish before they could use the highways. In Connecticut it was 19 hours before the residents of lower Fairfield County and the cities of Bridgeport and New Haven had unscrambled themselves and left. The nearly one million residents of southern Westchester required 24 hours to evacuate up the narrow column between the Hudson River and Connecticut. On the New Jersey side, the remaining 3.7 million residents were out after a day and a half. As the lanes began to open up in Connecticut and Westchester, the evacuation of the Bronx began--this movement was completed 40 hours after the high-altitude detonation. Since 10:00 a.m. Sunday, trains on the New York Central; New York, New Haven & Hartford; the Erie; and the Lehigh Valley had been taking out 40,000 people per hour, mostly in boxcars. Of the 7.7 million people still in Manhattan, Brooklyn, Queens, and Nassau County when the major flight began, 1.6 million had been transported in this manner. After New Jersey and the Bronx had cleared, the remaining 6.1 million were able to evacuate at a rate of 170,000 per hour, using both cars and trains. When the Soviet attack landed at 7:30 p.m. Tuesday evening, 57.5 hours after the official New York evacuation began, there were 3.5 million people left in the area, mostly residents of Brooklyn, Queens and Nassau County. The group of evacuees that was caught in transit by the detonation over Newark was largely of this composition. The evacuation was abandoned at this point as the remaining people quickly sought shelter.

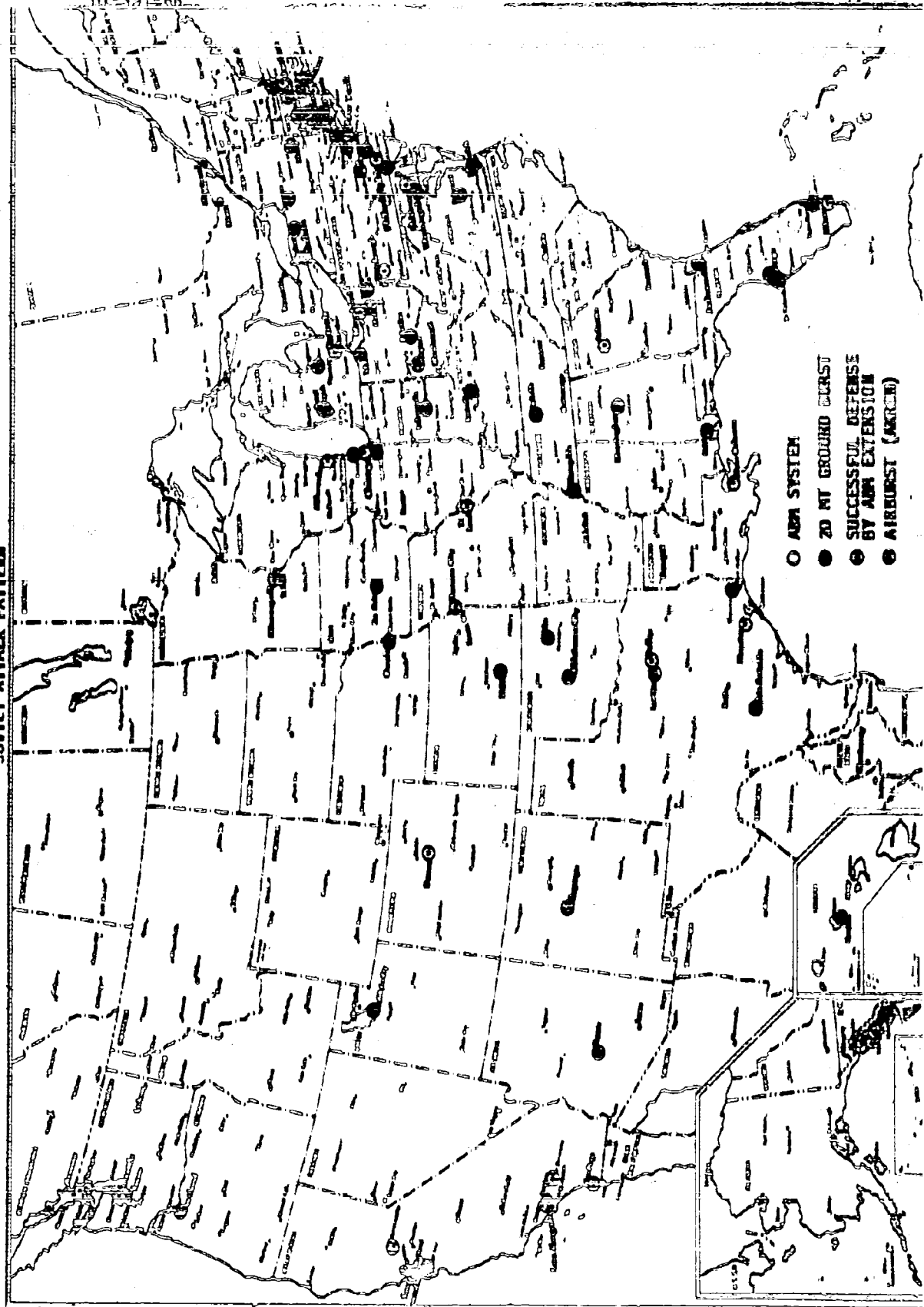
Monday, Nation-Wide Urban Evacuation: At midnight, Washington
July 30 time, a 10-megaton warhead was airburst on Akron, Ohio, and
12:00 M. a 100-MT high-altitude shot was exploded over the Mojave
B - 2½ Desert. Because SNEWS warning could not be disseminated
quickly enough, the attack came as a surprise to the Akron population.
Since about 60% had chosen to wait for an official order before evacuation
or moving to the mine, casualties were high. The news of the attack sent
other communities under cover, inducing several hours of nation-wide paral-
ysis which did not end until it became clear that this was an isolated vol-
ley, not necessarily the harbinger of a nation-wide attack. A phase of
frontal activity, set off by the federal government's national broadcast
ordering a complete nation-wide urban evacuation (or an alternative five-
minute standby at blast shelter places) followed this two-to-four-hour lull.
City personnel were dispatched to work through sections, alerting people who
hadn't heard the broadcast, to supervise the exodus to make sure everyone
left, and to provide aid to the old and the sick. In some localities sound

trucks were driven through the streets, rousing the neighborhood and broadcasting directions. In other areas teams went from door to door. In most instances they found people with packed suitcases ready to leave. In areas where some blast was expected, home owners had prepared as they would have for a hurricane; they carried valuables to the collar, took in yard furniture, and cleaned up any litter that would increase the fire hazard. In the meantime, traffic police were stationed to direct and control the exodus. Police vehicles and tow trucks were mobilized. Individual gas station operators were alerted to stand by for a rush. Retailers tried to get remaining stores of food, bottled drinks, tools, radios, lanterns, batteries, drugs and other useful commodities distributed among the evacuees or transported into the reception area.

Local government largely evacuated with the population. The major part of the police force, and heads and staffs of vital departments, often went out in their official capacities, although it was rare that really effective city governments in exile could be re-established. The scattered urban refugees generally fell under the authority of a local government in the reception areas to which they traveled. However, a municipal organizational structure was maintained for later re-entry and the skills of these officials were useful in the somewhat chaotic reception centers. A skeleton government responsible for preventing the city from burning down of ordinary causes, maintaining vital facilities such as the sewer system and the water supply for those residents who could not or would not evacuate (cities were 96% emptied on the average), supervising emergency operations and protecting against possible looting, was left behind. National Guard units from the area were sometimes called in to assist in guarding the cities from this latter threat. The fire department and skeleton utility crews remained behind to deal with the first two problems. These personnel would also be called on for rescue, firefighting and vital repair operations, respectively, in the event of an attack. Municipal and industrial equipment for fighting fire, clearing debris and repairing communications, utilities, sewers and roads, was stationed on the outskirts of the city when it was not in use elsewhere. On tactical warning the last emergency personnel left in the city would evacuate to protected stations in the same area.

At this point, even in reception areas where the attitude toward urban refugees was tinged by distrust and hostility, the President's statement plus the general air of emergency had galvanized public cooperation. Large amounts of bedding, food, clothing, and equipment for the refugees were being donated. Previously reluctant home owners began to prepare shelters in their dwellings adequate for outsiders as well as for their own families. In the towns, small businesses such as cafeterias and hotels offered their services and facilities, and in rural districts groups from local churches organized meals for the inflowing refugees.

SOVIET ATTACK PATTERN



The map displays the following locations and features:

- States and Regions:** VT., N.H., N.Y., CONN., PA., M.D.
- Cities and Towns:** Plattsburgh, Burlington, Montpelier, Rutland, Concord, Manchester, Troy, Schenectady, Albany, Binghamton, Syracuse, Utica, Watertown, Kingston, Oswego, Poughkeepsie, Newburgh, New Haven, Hartford, New York, Albany, Trenton, Philadelphia, Reading, Harrisburg, Allentown, Scranton, Wilkes-Barre, Williamsport, Pottsville, Lancaster, York, Lancaster, Philadelphia, Atlantic City.
- Geographical Features:** Lake Ontario, Hudson River, Delaware River, Chesapeake Bay.
- Legend:**
 - GROUND BU
 - SUCCESSFUL

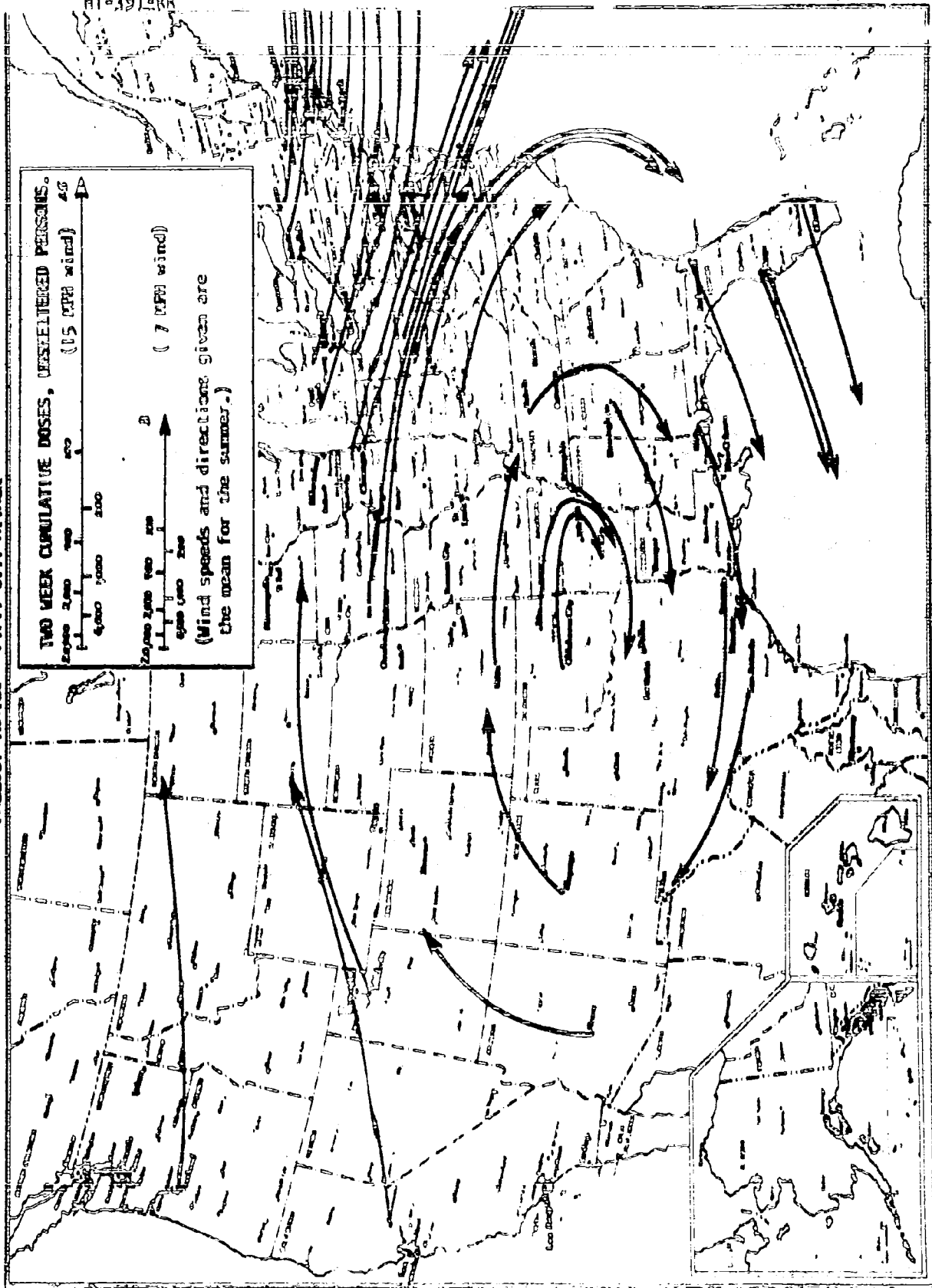
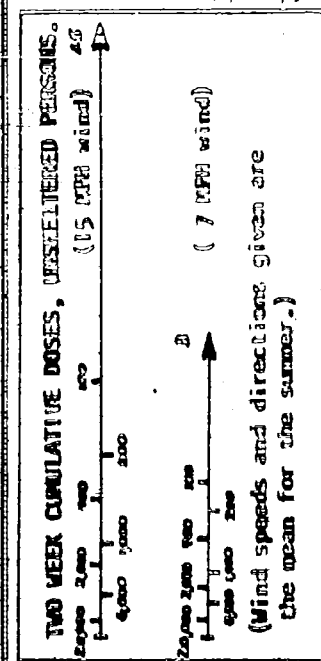
SECRET

+ GRIND BURST

**SUCCESSFUL ATTACK
BY AIM EXTENSION**

ARM SYSTEM

FALLOUT TRAILS - FIFTY-CITY ATTACK



THE POSTATTACK PERIOD--DAMAGES IN COUNTRY

Wednesday, August 1, 1950. Twenty-four hours after the Federal order to evacuate was given, the Soviet salvo against the 50 largest "undefended" American cities plus New York and Chicago arrived, 2:30 A.M. 8 + 24 hrs. Except for three large cities--Detroit, Chicago, and Los Angeles--all those cities that had elected to wait to evacuate until after the attack on Akron were able to complete this movement. The great majority of them cleared in less than eight hours. The country was, however, somewhat less successful in sheltering its urban population than evacuating it. The massive effort to construct expedient shelter in the reception areas and to enlarge the capacity of existing shelters by installing more ventilation had provided spaces for only about two-thirds of the urban population (even with overcrowding) by the time Akron was hit. Therefore, it was necessary for many refugees to improvise shelters upon their arrival. Some of these individuals were caught without shelter when the attack began. The severity of the problem differed from area to area. In the Northeast and Midwest, where most buildings have basements, it was possible for a cooperating group with some skilled supervision and aid to turn these into shelters with protection factors of 200 within eight hours. Thus the refugees of any northern city that could see its population evacuated, transported to their destinations and dispersed to their shelter site within 15 hours of the attack on Akron, could be well sheltered before the large attack arrived. Only five midwestern cities (Milwaukee, Pittsburgh, Detroit, Cleveland and Chicago) and two eastern ones (New York and Washington) did not meet these conditions. In the Southwest and West, where scarcity of basements forced refugees to construct community-style trench shelters from scratch or to resort to such devices as digging trenches beneath the floorboards of houses, the improvisation of a 100-PF shelter required between 30 hours and three days. However, since most of the western and southwestern cities evacuated two to four days before the large attack, refugees in these areas had time to complete their preparations.

The most severe shelter problem was felt in the South. This region, like the Southwest, is very poorly supplied with basements. In many areas the high water table renders such structures impractical. About two-thirds of the southern cities, notably Nashville, Memphis, Birmingham, Jacksonville,

The 25 largest American cities were known by the Soviets to have ABM coverage. Because they did not have enough forces to saturate the defenses of all 25, only New York and Chicago of this group were attacked. Ten 10-MT missiles were launched against each of these two cities. Two missiles penetrated the Chicago ABM system and one penetrated near New York. In addition, one 20-MT warhead was launched at each of the next 50 ranking cities, which the Soviets believed to be undefended. In actuality, extensions of the original 25 ABM systems, constructed during the preceding year, protected 12 of these targets (see page 5). Consequently, only 38 of these missiles penetrated. For details on the disposition of the attack and the resulting fallout patterns, see the maps on pages 17-19.

Cities which had begun their evacuation earlier were successful, except for New York.

Nobilo and Beaumont-Port Arthur along the Gulf, did not begin to evacuate until Akron was struck. Late-arriving refugees who could not be accommodated in existing shelter were not able to turn to improving basements, nor, because of the high water table in many areas, could they get into covered trenches. The options open to refugees without special materials and equipment were piling earth over small above-ground structures or improving the protection factors of the internal rooms of houses. These were time-consuming and required skills that many did not possess. Thus many refugees downwind of southern cities were unable to complete their preparations before the fallout arrived, and were forced either to overcrowd existing shelter, to take lesser protection, or to try to move out of the fallout's path.

There were serious difficulties connected with all of these alternatives. Refugees who would have chosen to drive to a different area if they had had a clear picture of the situation after the attack were hampered by the lack of hard information concerning fallout paths. Attack monitoring stations, which had first been established around the country in 1964, began reporting detonation and fallout data almost immediately after the attack. It was two or three hours, however, before the data could be correlated and meaningful reports relayed to refugees via CB radio, even in areas where all parts of the system for doing this survived the attack in good order. Even more important, the inability to predict wind direction perfectly made it impossible to tell refugees where fallout would fall with sufficient exactitude. Most refugees managed to locate some kind of cover when the attack warning was given. By the time coherent fallout reports began coming in, many had begun to improve the protection factors of these places. Most who learned at this point that they were in a possible fallout zone chose to devote the time left them to improving their shelters further, rather than trying to move out of this broad and vaguely defined threat area. The risk that they might inadvertently drive into fallout rather than away from it, and the knowledge that if they were caught in transit they would have no protection at all, was too deterring. Even when fallout arrived, people tended to stay put out of fear of exposing themselves to the radiation intensities outside, and uncertainty about which direction would take them deeper into the cloud, and which would take them out.

Many people who had taken inadequate shelter and failed to improve it before fallout arrived, later succumbed to the radiation doses they received. For example, in the South, people in unimproved basements were exposed to doses of 200 roentgens or more as far as 95 miles downwind from the detonation. Unprotected people would receive doses of this order at 230 miles.* However, since the slow summer winds did not deposit fallout

*The fallout model upon which these calculations were based was derived from the idealized unit-time referenced dose-rate pattern for a one-megaton fission yield surface burst, to be found on page 449 of the Revised Edition of The Effects of Nuclear Weapons. To scale this idealized pattern for the 20-megaton, 2/3 fission yield explosions which were postulated in the scenario, the dose rate within each contour and the dimensions of the

on these areas until 13 and 31 hours, respectively, after the detonation, most people this far out had time to improve their protection adequately. The greatest number of radiation fatalities occurred closer in, where poorly sheltered people were subjected to very intense fallout in the first six or seven hours after the detonation.

Where refugees caught by fallout chose to seek into shelters that had already been overcrowded, ventilation sometimes became a problem. The shelters that had been built as part of the full fallout shelter program, that had assured water supplies and special ventilating installations, proved capable of absorbing as many people as could be found room for. Although the occupants of overcrowded regulation shelters were usually extremely uncomfortable, by dint of drinking much water and staying inactive they did not succumb to heat prostration. However, where lotteries crowded the improvised trench or basement shelters, temperatures

contour were expanded proportionately to the cube root of the increase in fission yield. That is:

$$\text{Scale factor} = (W1)^{1/3} = (2/3 \times 20)^{1/3} \approx 2.5$$

The effective wind speed associated with the Handbook pattern is 15 mph. Since the mean summer wind speed in the northern part of the country is also 15 mph, no further adjustment of the pattern was made for this section of the country.

For the southern parts of the country with about one-half the mean wind speed, application of the scaling laws recommended in the reference (p. 451), required a doubling of the dose rate and a halving of the up-wind dimension. Correction of the expanded pattern for wind speed in this manner yielded a southern pattern which was only 25% more elongated than the standard 1-MT pattern supplied by the Handbook. However, the dose rate at any point within this pattern (outside the immediate area of the detonation) was five times as great as the standard. (As in the North, the maximum dose rate was assumed to be 10,000 r/hr in the detonation area.)

For the conversion of reference dose-rate into dosage, we employed the "unit-time dose-rate multiplying factor" scale available on page 429 of The Effects of Nuclear Weapons. The exposure period for people at any point downwind of the explosion was taken to begin one hour after the first appearance of fallout in the area as this was indicated by figure 9.67a on page 444 of the Handbook. As an approximation of this entry time we used the distance from the detonation divided by an effective wind speed of 15 mph in the North and 7.5 mph in the South. The multiplying factor associated with each entry time was read off the scale's two-week exposure curve. (We did not assume that everyone in a contaminated area would stay in shelter two weeks. However, we estimated that for most people the in-shelter dose added to the dose they could absorb while traveling to less contaminated areas would be as large as the dose they would have absorbed in two weeks in the shelter, no matter when they left.)

Along the longitudinal axis, multiplication factors gathered in this manner ranged from about 3.5 at 15 miles to about .6 at the distant edges. The external two-week radiation dose thus determined is shown in the table on page 23.

Downwind Distances (miles)	Unit-Time Dose-Rate (R/Hr.)		Unit-Time Dose-Rate Multiplication Factor		Two-Week Radiation Dose (Roentgens)	Consequences
	North	South	North	South		
15	8,700	10,000	3.5	3.0	30,000	Some fatalities among occupants of 100-PF shelter
40	7,600	8,600	2.7	2.3	20,000	80-100% fatalities among occu- pants of unimproved basements (PF = 10)
90	2,900	3,200	2.1	1.9	6,000	Some fatalities among occupants of unimproved basements
145	1,200	1,250	1.7	1.6	2,000	Incidence of disabling radiation sickness among occupants of unim- proved basements
185	670	710	1.5	1.4	1,000	Some fatalities among occupants of unimproved 1st floor rooms (PF = 2)
255	285	320	1.4	1.25	400	Incidence of disabling radiation sickness among occupants of unim- proved 1st floor rooms; some fa- talities among unprotected refu- gees (camping in fields)
350	150	180	1.3	1.1	200	Incidence of disabling radiation sickness among the unprotected
480	80	105	1.2	1 -	100	

move rapidly and occupants in fallout areas were soon faced with a Hobson's choice. In areas of light fallout, such problems were easily solved. Part of the shelter population could move into unimproved basements and inner rooms of buildings, which offered adequate PF's under such conditions. If hard information was available, they could move out of the area entirely. However, in highly contaminated areas, a significant number of refugees in such situations succumbed to heat or were forced into inadequate shelter.

Some deaths also occurred in perfectly well-built and uncrowded shelters where the external radiation was too high. Occupants of shelters offering protection factors between 125 and 100 and located less than 30 to 40 miles downwind of the detonation, or in isolated hot spots further out, received two-week doses of over 200 reentgens. The doses were light enough so that those who received medical attention (including antibiotics and blood transfusions) during their critical period four to six weeks after the attack had a good chance of surviving. However, there was a 20% fatality rate among such persons. Cases of non-fatal radiation sickness occurred in the lower PF shelters (less than 150) out to 60 miles or so from the detonation, and in 200-PF shelters out to 30-40 miles. Fallout deaths in shelters were held to a minimum, however, because residents within 15 miles of city centers had been evacuated along with the city population to protect them against blast, and refugees were not directed to those quarters of the reception area where heavy fallout would be deposited by the normally prevailing winds of the season. Fallout fatalities as a whole amounted to a relatively small fraction (2%) of all civilian deaths, since they occurred almost entirely among those in the most intensely irradiated areas and among that portion of the evacuating public who, for some special reason, were without adequate shelter and were caught in the fallout's path. (Figures for deaths in these categories appear on the summary chart at the end of this paper.)

The bulk of the American casualties in the 1973 war were associated with the large cities, particularly New York and Chicago, that were successfully attacked while their evacuations were still incomplete. Of the cities whose major evacuation problem was sheer size, Washington and Milwaukee escaped most lightly. Both cities initiated their evacuations about two hours after the attack on Akron, and required 14 to 15 hours to clear (Milwaukee because it was forced by bad timing on the part of both cities to camp out with Chicago for the use of its southwestern evacuation routes). The last evacuees were not processed through the reception centers until about 9:30 Tuesday morning, two hours before the 50-city attack. Consequently, many refugees were caught in the midst of converting basements into fallout shelters when the 50-city attack landed. Fortunately, the Milwaukee reception areas were not exposed to fallout at all, and that which arrived in the Washington areas fell after 25 hours and was light enough so that the protection afforded by unimproved buildings, even without basements, was adequate to prevent debilitating illness.

*Since many cities, including 23 of the 25 largest, had been untouched by the attack, the necessary medical resources could be mobilized.

Cleveland and Pittsburgh were somewhat slower to evacuate than these first two cities and were less fortunate in their placement vis-a-vis fallout. Cleveland's evacuation was much disrupted by the earlier attack on Akron, which caused light blast damage in the southern suburbs of the city and closed most evacuation routes leading in that direction. The city required 18 hours to evacuate rather than the anticipated 13. While all citizens were able to reach their reception destinations by the time of the major Soviet strike, of the one-third who were forced to improve shelters in private basements, about 200,000 did not have time to complete such preparations when the attack landed. Unsheltered refugees to the leeward of Toledo were faced with the same problems and choices as the unsheltered refugees in the fallout zones in the South, and many succumbed. Broader sections of the Cleveland reception area were exposed to fallout from Chicago, Des Moines and Omaha. However, since the earliest of this arrived after 20 hours, it was not particularly troublesome.

Pittsburgh had a particularly disastrous crisis period. The fact that ventilating equipment adequate to sustain large populations had only been installed in one mine shelter out of five was brought to public attention about a week before the attack. While intense efforts to install such equipment ensued, the mines were only partially ready by the time Akron was attacked and could only absorb about one-half the Pittsburgh population. The remaining refugees, who could not be accommodated in the shelter programmed for the non-urban population, were forced to improvise, since the crisis energy had been directed toward preparing the mines rather than building shelter in the reception areas. The city required 15 hours to evacuate and about 170,000 people had not completed their shelter preparations when the major Soviet attack landed. The reception areas directly north of Pittsburgh were heavily irradiated by fallout from Youngstown, and unsheltered refugees in the line of this fallout suffered the same fate as those Cleveland refugees in areas downwind of Toledo.

The attack halted the evacuation of Detroit at the three-quarter mark. Unevacuated residents hurried to existing urban shelter and hoped that the active defense would work well. Motorists stopped by the roadside and took cover in basements of nearby houses, or drove into nearby towns adopting the best available shelter there. Since the city itself was not attacked and abundant fallout shelter was available, the unevacuated population fared well. The portion of the population that was in transit, however, was subjected to many dangers. About 60,000 evacuees who were traveling in the vicinity of Grand Rapids, Flint, and Toledo on their way to other destinations, were killed by blast and thermal effects. Furthermore, the towns and villages near the highways, where the travelers attempted to find protection, were usually already crowded with refugees and could not provide quality protection for the new influx. In this part of the country, people downwind of the bursts and protected by unimproved basements only, were exposed to almost certainly fatal radiation doses of over 600 reentgens if they were within 90 miles of the detonation, and to doses of 200-600 reentgens for the next 55 miles. The fallout traveled 90 miles in six hours, giving unsheltered refugees in the most intense zone little time to improve their shelters. Consequently, many evacuees traveling downwind of

Grand Rapids, of Flint, or in the path of the fallout from the two Chicago explosions, which blew across the lake and the base of the Michigan peninsula, were killed. Additional fatalities occurred among people who had arrived at reception areas in those fallout zones before the attack, but had been unable to complete their shelter preparations.

Of the cities that were unable to complete their evacuations before the major Soviet attack, only New York and Chicago were struck. For the other cities the evacuation resulted in increased rather than reduced fatalities. Chicago, which suffered the most, was only two-thirds evacuated when it was attacked. The city was hit twice, one missile penetrating its ABM defenses in the Evanston area, and the other detonating in the south side, about four miles east of Midway Airport. About three-fourths of the property in the urbanized area was damaged by blast, and about 20 square miles of the central area destroyed in a firestorm. Consequently, very few of the 2,125,000 residents still in the city survived. Refugees on the highways who were more than 10 miles out at the time of the attack escaped the severe effects of the explosions, except for those on the east shore of Lake Michigan, who were exposed to heavy fallout blowing across the lake. Fatalities occurred among these motorists and the refugees in the area who were unable to obtain adequate shelter in time. One other part of the Chicago reception area received fallout, but this, coming from Des Moines and Omaha 20 and 28 hours later, was not troublesome.

New York City was far more fortunate. There were approximately 1 million people left in the urban area at the time of the attack, most of them residents of Brooklyn and Queens. The one missile that penetrated the ABM defense exploded in Newark, and almost all blast and fire damage was confined to the Jersey side, which had completed its evacuation. Thus, the blast fatalities were largely restricted to the 40,000-50,000 evacuees who were traveling through the area on the way to reception areas in Pennsylvania. People waiting in Manhattan, Queens and Brooklyn for their time to evacuate were rapidly subjected to heavy fallout. However, an abundance of high-quality fallout shelter was available to these people (despite the shattered windows in most of this city), some of it offering protection factors of 1000 or more. Consequently, fallout deaths in the city and on Long Island were small. However, fatalities among New York residents still in transit outside the city increased the death total. Some motorists on their way to reception areas in northern New England and upper New York State were caught by blast or fallout from the attacks on New Haven, Waterbury-Hartford, Springfield and Albany.

In comparison with these other large cities, the Los Angeles experience was almost comic. The attack on Akron deeply alarmed the city. The bulk of the population, who had previously been willing to go along with the city government's non-evacuation policy, changed their minds. Within five hours of the attack on Akron, private offers to leave had reached such a scale that the city government was forced to go along officially. The evacuation was unplanned and ill-supervised. Reception area destinations were left to individual choice, influenced by the advice on traffic conditions and the availability of shelter which could be picked up on car radios. Refugees who evacuated north along the coast, eastward into the

Palm Springs area, and southward toward San Diego, generally tried to improvise shelter in basements or under houses, although many places had already been taken by refugees from San Bernardino and San Diego, who had moved in earlier in the week. A smaller number went into the mountains north and northwest of the city, where they attempted to construct trench-style shelters for themselves, using the locally available timber for shoring and roofing. Many more evacuated northwestward across the desert for destinations in Nevada and northern California. The city was one-third evacuated when the attack warning preceding the 50-city strike halted these migrations. As people in the city and reception areas took cover, those in unpopulated areas, fearing fallout more than direct attack, accelerated their shelter preparations. Motorists crossing the desert pulled their cars off the road and began to dig trenches. After about two hours, when it began to appear that there might be no more attacks for the time being and it was found that there was no fallout in the areas, most of these people, impelled by the rigors of the desert, continued traveling. After some delays caused by traffic tie-ups, the evacuation as a whole was resumed. The city evacuated 50% more of its population in the day and a half between the 50-city attack and the cease-fire, at which point the evacuees began to abandon their foxholes and trickle back to the city. Since Los Angeles was not attacked, and the attack on the Riverside-San Bernardino complex was successfully stopped by the ABM extension, there were no fatalities save those connected with the evacuation itself.

American Fatalities in the July WarBlast

Urban Fatalities	3,080,000
Akron	330,000
Chicago	2,120,000
38 smaller cities	630,000
Evacuees in transit near attacked cities	250,000
New York City	190,000
Detroit	60,000
TOTAL BLAST	3,330,000

Fallout

Deaths in regulation shelters (in areas of extremely high fallout)	220,000
New England	130,000
Remainder of the country	90,000
Deaths among inadequately sheltered refugees in high fallout areas	80,000
Southern cities	65,000
Detroit	5,000
Chicago	2,000
Cleveland	2,000
Pittsburgh	1,000
Deaths among motorists traveling in downwind areas at the time of the 50-city attack	560,000
Detroit	290,000
New York	220,000
Chicago	50,000
TOTAL FALLOUT	860,000
TOTAL FATALITIES	4,190,000

Typical Breakdown of Yearly Civil Defense Budget
for Fiscal '67 through '73

Yearly Civil Defense Budget (in millions)	\$1,000
OCD Normal Operations Budget.	\$100
Includes	
Research & Development:	\$20
Emergency.	\$13
Recuperation & Recovery.	\$ 2
Other.	\$ 5
Special Program for Emergency	
Planning & Preparation.	\$100
5,000 professionals in the field	
at an average of \$12,000/year.	\$60
Overhead of \$6,000/professional/	
year	\$30
Preparations (printing & deployment	
of information & instructions,	
limited storing of supplies in the	
reception areas)	\$10
Full Fallout Shelter Program	\$800
32 million spaces per year*	
at \$25.00 per space ¹⁰⁰	\$800

*Program goal is 250 million spaces. Actual construction began in the spring of '68. About 215 million were completed at the time of the article, July 1973.

¹⁰⁰\$25.00 is an average federal cost at a 6 sq. ft. per person criterion. A large proportion of spaces come free, or almost free, in existing buildings and adaptations of mines and tunnels. Those which had to be subsidized in new construction were higher. The price includes \$2.50 - \$3.00 per space for supplies.